AMERICAN MUSEUM
Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, NY 10024
Number 3427, 12 pp., 18 figures February 27, 2004

A Revision of the Genus *Asteloeca* (Hymenoptera: Vespidae; Polistinae)

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ABSTRACT

The polistine genus *Asteloeca* Raw is revised. Previously monotypic, three species are recognized in the genus: *A. traili* (Cameron), the type species; *A. ujhelyii* (Ducke), newly raised from synonymy with *A. traili*, **revised status**; and *A. lutea* **new species**. New distributional records for *A. traili* and *A. ujhelyii* are provided from Brazil, Ecuador, and Peru. *Asteloeca lutea* is described from Bolivia, Brazil, and Ecuador, and probably occurs in French Guiana. The male genitalia of *A. traili* and *A. ujhelyii* are illustrated, the larvae compared, and photographs provided of the nests of all three species.

INTRODUCTION

The paper wasp genus *Asteloeca* was described by Raw (1985) as monotypic for *A. traili* (Cameron). That species was recorded principally from Amazonia, and while little was known of its behavior, the structure of the nest was considered to be of the "astelocyttarus" type (Richards and Richards, 1951: 6): lacking any petiole, with cells constructed on a flat surface, and an envelope covering the comb. All genera constructing similar nests are "swarm-founding" (Jeanne, 1980: 372), with new colonies founded by

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swarms of queens and workers. These wasps are members of the tribe Epiponini, a group consisting of 20 genera with more than 200 described species, which are all endemic to the Neotropics (Carpenter, 1993).

Fieldwork conducted by the authors and colleagues over the course of the last 14 years has resulted in substantial new collections of *Asteloeca*. Study of this material has revealed that there are no fewer than three species masquerading under the name *A. traili*. The taxonomy of the genus is accordingly revised in the present work, and three species recognized: *A. traili*; *A. ujhelyii* (Ducke) **revised status**, which is newly raised from synonymy with *A. traili*; and *A. lutea* **new species**.

BACKGROUND

Asteleoeca traili was originally described in the genus *Polybia* by Cameron (1906), evidently based on a single female, from the Rio Purus in Amazonas, Brazil. Not long thereafter, Ducke (1909) described *Polybia ujhelyii*, based on numerous females from Tefé (as Teffé) in Amazonas. He also alluded to a slightly different female from French Guiana (Les Hattes on the lower Maroni). In the same paper, he described *obscura* as a variety of *P. ujhelyii*, based on a single female from Fonte Boa (as Fontebôa), Amazonas. In his subsequent revision of epiponines, Ducke (1910) repeated the information from his description for *P. ujhelyii* and var. *obscura*, but mentioned *P. traili* only as a possible synonym of *P. pseudomimeticus* Schulz, 1904, which was placed in the genus *Megacanthopus*, now considered a subgenus of *Mischocyttarus*. Bequaert (1944: 281) mentioned seeing *P. ujhelyii* from Bolivia, without further detail regarding locality; he did not mention var. *obscura* or *P. traili*.

In his monograph of New World Polistinae, Richards (1978) treated all of these taxa. He described a new genus, *Occipitalia*, in which he included *P. traili*. This placement was due primarily to the discovery of the nest of this species, as he stated (Richards, 1978: 198):

> It has always been noted that *P. sulcata* and *P. traili* (*P. ujhelyi* [sic]) were very unusual species of *Polybia* but they were rare and nothing was known of their biology. Dr W. D. Hamilton found them in some numbers on the Amazon and discovered that the nests are astelocyttarus, quite unlike any species of *Polybia* (all phragmocyttarus). I think therefore it is appropriate that they should be generically separated since they also lack the pronotal fovea found in all other *Polybia*.

Phragmocyttarus nests are constructed without petioles, but with each comb covered by an envelope and succeeding combs built upon the envelopes of those preceding. Richards did not, however, describe the nests in any detail.

Richards (1978: 199) synonymized both *P. ujhelyii* (misspelled as *ujhelyi*) and the var. *obscura* with *O. traili*. He saw the holotype of the latter, and designated the lectotype of *P. ujhelyii*. Oddly, however, he recognized *ujhelyii* as a "morph" of *traili*. The category morph is presently without nomenclatural standing, as was the case under the rules of nomenclature then in force, but Richards italicized the names of his morphs, and provided keys to distinguish them. For *O. traili*, *ujhelyii* was distinguished as the morph with the [metasomal] ground-color testaceous, while *traili* was the morph with the ground-color black or black and red. The var. *obscura* was characterized as the being the dark morph, that is, *traili*. Richards did not state why he considered these morphs to be one species, but it may have been due to presence of both forms in one of his samples, or to an "intermediate" specimen, as he stated:

> Dr Hamilton found one nest at AM: Caruari, 30.xi.68 and three at AC: Cruzeiro do Sul, 23–25.xi.68, all on trees with *Azteca* ants. The females were dimorphic with the ground colour of the gaster either black (a) or red-brown (b). In the sample from the nests from Acre, the proportions were 9a 15b ♀7a 1b ♂. In the Amazonas sample, it was 1a 1 intermediate (i.e., red-brown much darker) ♀ and 3 ♂ a.

This leaves unclear whether the series with both forms, from Acre, had both forms on any of the three nests, rather than mixing distinct forms from different nests. We infer that the case was the latter. The "intermediate" specimen is not really intermediate, as discussed below for another specimen of *A. traili*.

Raw (1985: 185) split *Occipitalia*, stating: "Morphologically, the two species are quite different so I compared them with related genera. The genus is not monophyletic, but neither of the two species is sufficiently close

to any recognized genus to justify a transfer." He described the new genus *Asteloeca* for *traili*. He considered (Raw, 1985: 187) that "*Asteloeca* is part of a natural group whose other members are *Clypearia* de Saussure, *Occipitalia*, *Metapolybia* Ducke and *Synoeca* de Saussure" and that "*Asteloeca* lies closer phylogenetically to *Metapolybia* than to *Occipitalia*." Both conclusions have since been corroborated: Those five genera form a monophyletic group (Carpenter, 1991) within which *Asteloeca* and *Metapolybia* are sister-groups, while *Occipitalia sulcata* is the sister-group to the genus *Clypearia* (Wenzel and Carpenter, 1994; Carpenter et al., 1996). Carpenter et al. (1996) synonymized *Occipitalia* with *Clypearia*, on the grounds that the single species included in *Occipitalia* is intermediate in both the morphological and nest architectural characters that defined *Clypearia*. That is not the case for *Asteloeca* with respect to *Metapolybia*, and as will be shown, there are additional species of *Asteloeca*.

The nest of *Asteloeca* was described and photographs published by Garcia (1978: figs. 49–51), who collected a single colony of *Polybia traili* in Iparia, on the Rio Pachitea in Ucayali, Peru. From his description of the adults it is clear that his species was actually *A. ujhelyii*, as he mentioned the "ferrugíneo-rojizo" metasoma. Garcia considered the nest to be unlike any other type of paper wasp nest; however, he did not mention the term astelocyttarus. A nest collected by Carpenter and John Wenzel on the Rio Sucusari in Loreto, Peru, was the nest studied in Carpenter et al. (1996) and compared with *Occipitalia sulcata*, and was the complete nest seen and illustrated by Wenzel (1998: 13, figs. 19D, 24B) for the construction of his generic key to nests. The species was listed as *A. traili* but is actually *A. ujhelyii*. As that key shows, *Asteloeca* has similarities with other genera constructing astelocyttarus nests, but differs from all the others by having the comb back showing the cell bases and the comb sides showing the cell contours. These few described nests all projected beyond the base of the narrow support (a tree branch), and the numerous nests we have now seen are identical in these traits.

The larva of *Asteloeca* was described and illustrated under "*A. traili*" by Kojima (1998: 177, figs. 1150–1158), based on specimens of from one of Hamilton's nests from Cruzeiro do Sul. Carpenter has seen adult specimens from the nest collected on the date cited; these are *A. ujhelyii*, so the larval description refers to that species. We did not find any distinct differences between the larvae of *A. traili* and *A. ujhelyii* that we examined. A few characters that Kojima (1998) did not mention are discussed in this study.

TAXONOMY

Genus *Asteloeca* Raw

Asteloeca Raw, 1985: 185, genus.

TYPE SPECIES: *Polybia traili* Cameron, 1906, by original designation and monotypy.

Raw's (1985) diagnosis of the genus *Asteloeca* does not require substantial emendation with the inclusion of the new species. Relative to other polistine genera, *Asteloeca* may be characterized by: forewing with prestigma shorter than pterostigma; hindwing with jugal lobe present; Cu1 shorter than cu-a; antennal articles 12 in females and 13 in males; ridgelike tyloides absent on male antennae, replaced by flattened areas; ocelli not enlarged, posterior ocelli close together; clypeus with apex rounded and lateral lobes reduced and rounded, profile convex; tempora broader than eye; gena regularly curved; malar space short; mandible with basal flange on external edge; maxillary palpi six-segmented and labial palpi four-segmented, labial palpomere three without strong recurved bristle; occipital carina absent; eyes without bristles; pronotum with anterior margin lamellate, more broadly ventrally than dorsally, pretegular carina present, lateral fovea absent and no anterodorsal fovea, dorsal carina absent, anterior carina extended dorsally, lamellate; propleuron with lateral groove; forecoxa laterally produced; mesopleuron with dorsal groove absent, secondary spiracular entrance tuberculate, scrobal sulcus present, epicnemial carina absent; scutal lamella reduced; scutellum rounded, weakly convex; metanotum compressed, convex, metanotal lobe absent; propodeum without dorsal carinae, concavity narrow, orifice narrowly rounded dorsally; propodeal valvulae lobate; mid- and hindtarsi symmet-

rical; first metasomal segment petiolate, in dorsal view narrow, abruptly expanded near spiracles then subparallel posteriorly, with maximum width before apex, posterior part flat in lateral view; thyridium on second metasomal tergum basal, expanding in posterior subtriangle; thyridium on second metasomal sternum linear, elongate; Van der Vecht's gland externally absent; male genitalia with cuspis and lamina volsellaris fused.

The nest may be characterized by: comb sessile, initiated on a narrow branch, no pulp foundation; secondary combs absent; envelope a single sheet continuing from comb margin, shape a flattened dome, abruptly angled near comb face, reinforced by glossy secretion, lines of construction long, parallel, clearly apparent; cell bases visible on back of comb, which projects beyond support; cell wall contours visible; entrance central, with short peripheral collar; material coarse chips; ant-guards absent.

Asteloeca is phylogenetically close to three other genera of Epiponini: *Synoeca*, *Clypearia*, and *Metapolybia*, with which it shares the derived features of loss of the dorsal pronotal carina and construction of astelocyttarus nests. Neither of these characters is unique to this lineage, but *Asteloeca* further shares with *Clypearia* and *Metapolybia* a dorsally lamellate anterior carina on each side of the pronotum. *Asteloeca* is established as the sister-group of *Metapolybia* by the mandibles having the external margin drawn out into a flange basally, a unique synapomorphy. Autapomorphies for *Asteloeca* include the form of the lamellate anterior margin of the pronotum, which is broader ventrally than dorsally, not of more or less uniform height throughout; and the form of the first metasomal segment, which is flattened posteriorly in lateral view. Both of these characters were noted as unique to *Asteloeca* by Raw (1985). To these may be added the form of the nest, which is different from all other astelocyttarus nests in several respects, notably the cell margins and bottoms visible through the envelope.

Key to Species

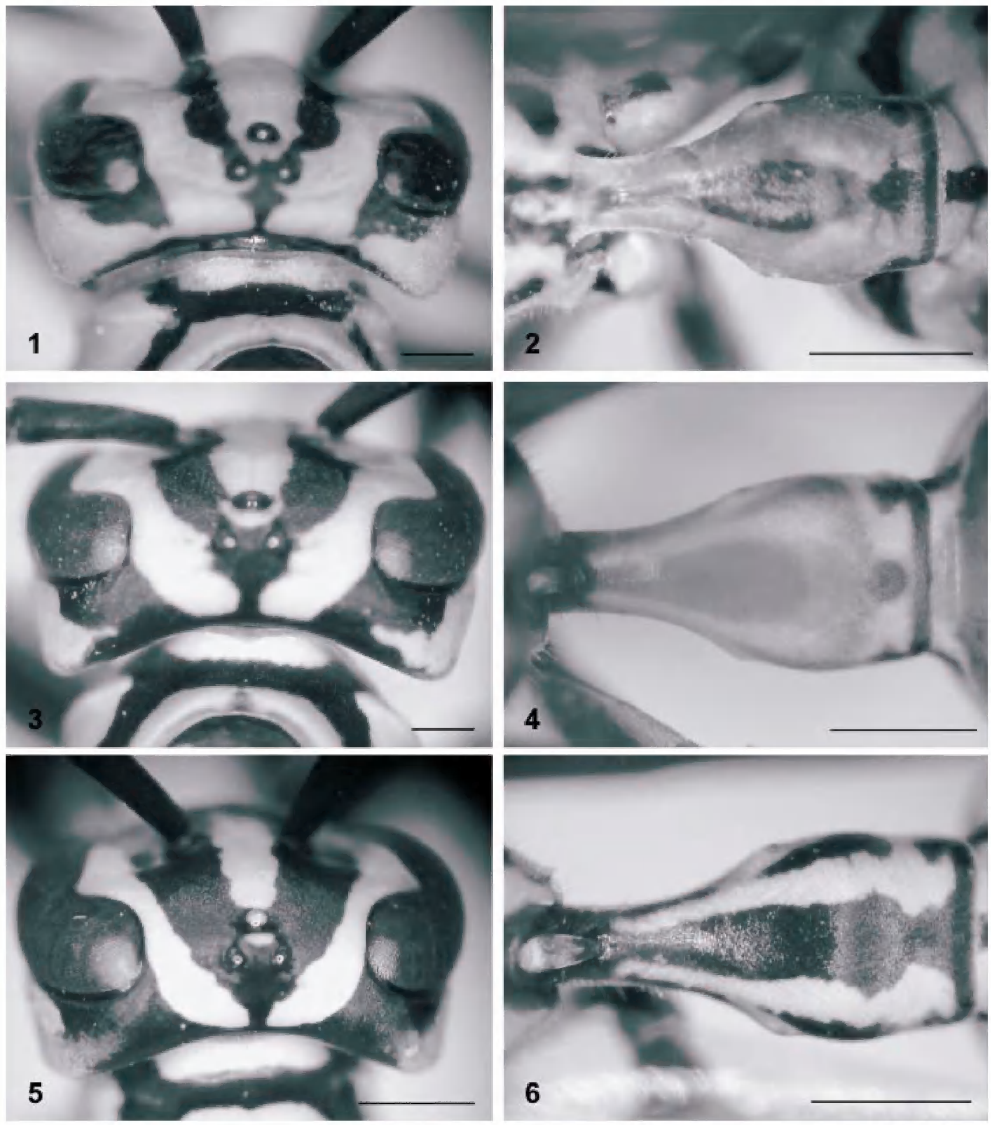
1. Occiput compressed, drawn out posterolaterally, in dorsal view almost forming flange behind eye (figs. 3, 5); first metasomal segment in dorsal view more elongate, apically flask shaped (figs. 4, 6); mesepisternum with complete black stripe along anterior margin. 2
— Occiput rounded behind eye in dorsal view (fig. 1); first metasomal segment in dorsal view shorter, apically relatively broader and more bulbous (fig. 2); most of mesepisternum yellow, without complete black stripe along anterior margin. . . . . *lutea* Carpenter, n. sp.
2. Ground color of metasoma black, occasionally tinged with brown or dark red; female with thyridium on second metasomal tergum narrower throughout (fig. 7); male genitalia with paramere strongly angulate ventrally (fig. 16). . . . . *traili* (Cameron)
— Ground color of metasoma reddish-orange; female with thyridium on second metasomal tergum broader (fig. 8); male genitalia with paramere rounded ventrally (fig. 15). . . . . *ujhelyii* (Ducke)

Asteloeca lutea Carpenter, new species

Figures 1–2, 9–11

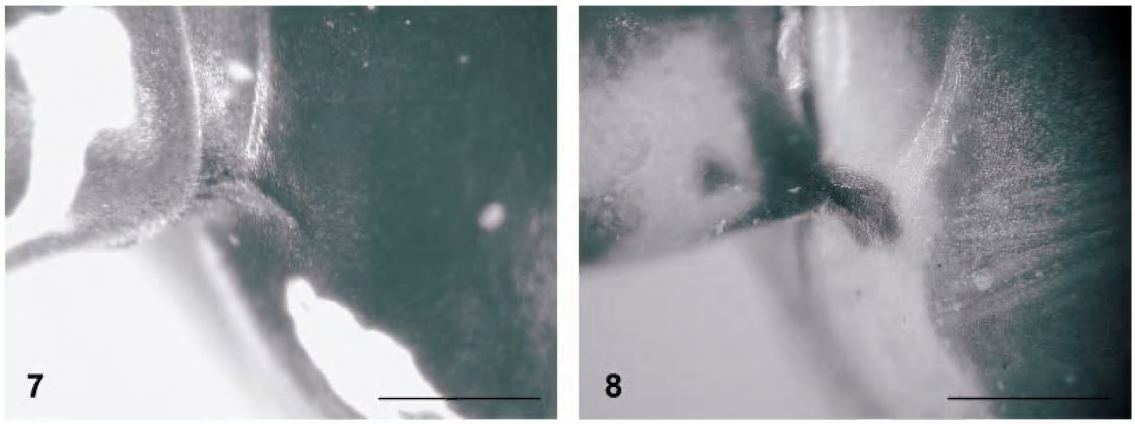
Diagnosis: Head in direct dorsal view with occiput rounded laterally, not compressed and slightly drawn out posterolaterally as in *A. ujhelyii* and *A. traili* (cf. fig. 1 with figs. 3, 5). First metasomal segment shorter than in *A. traili* and *A. ujhelyii*, with proximal "stem" shorter, not longer than wide, posterior "bulb" wider in dorsal view, not flask shaped (cf. fig. 2 with figs. 4, 6). Yellow on mesosoma more extensive than in *A. ujhelyii* (and *A. traili*), without a complete black stripe running vertically along the anterior margin of the mesepisternum; ground color of metasoma yellow, discs of terga stained with dark reddish or brownish, staining occasionally extensive, and pale orange in one specimen, with contrasting blackish stripes and spots. Tibiae and basitarsi light brown, not dark brown to black. Wings yellowish anteriorly, basal cell mostly yellowish, not mostly hyaline as in *A. traili* and *A. ujhelyii*; venation light not dark brown. On average slightly smaller than the other species (range in forewing length 10.8–11.6 mm vs. 11.0–12.4 mm).

Description: *Female*: forewing length 10.8–11.6 mm. Clypeus slightly wider than long; interantennal area with longitudinal



Figs. 1–6. Female in dorsal view. 1–2, *Asteloeca lutea* n. sp.; 1, head; 2, first metasomal segment. 3–4, *Asteloeca ujhelyii* (Ducke); 3, head; 4, first metasomal segment. 5–6, *Asteloeca traili* (Cameron); 5, head; 6, first metasomal segment. All scale bars are 1 mm.

line faint; occiput in dorsal view forming a nearly smooth curve between eye and posterior margin of head; vertex in dorsal view emarginate posteriorly; propodeum with dense transverse striae, fading away before reaching metapleural margin; propodeal concavity linear, moderately narrow and deep; metasomal segment I in dorsal view with proximal petiole between suspensory ligament and flaring portion wider than long, apical expanded portion bulbous, wider than long, both sections as long as wide in one specimen; thyridium on metasomal tergum II basal, subtriangular, rather narrow. Cuticle smooth throughout, appearing somewhat velvety, few macropunctures visible, only propodeum striate. Vestiture little outstanding, with long bristles only ventrally on clypeus and on propodeum; shorter hairs anteriorly on pronotum, on venter and anteriorly on coxae. Coloration yellow; black (or brownish) are the antennae dorsally on scape, ped-

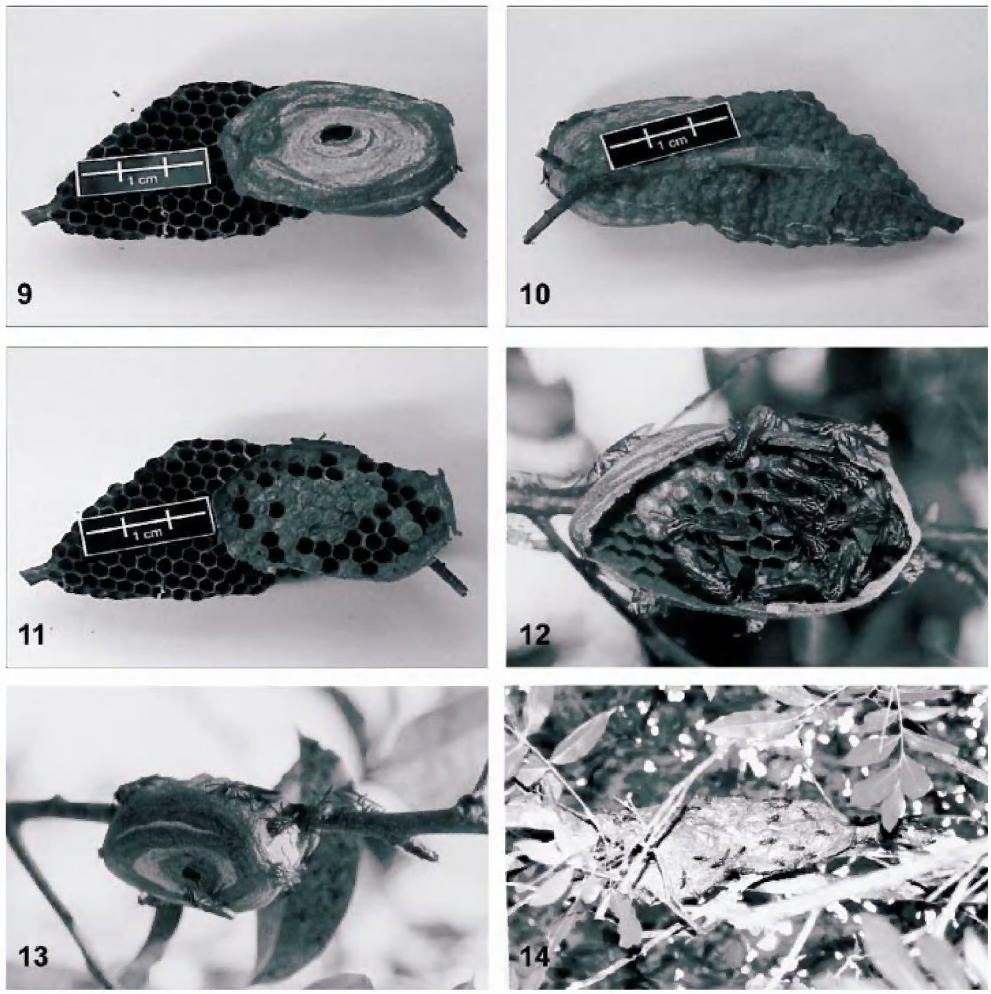


Figs. 7–8. Thyridium on second metasomal tergum of female. 7, *Asteloeca traili* (Cameron); 8, *Asteloeca ujhelyii* (Ducke). All scale bars are 0.5 mm.

icel and basal half of flagellum; a line running from vertex and dividing at lateral ocelli, then running through antennal sockets and reuniting at frontoclypeal suture, then running ventrally two thirds length of clypeus, sometimes lines interrupted at ocelli or antennal sockets, or largely absent on clypeus; lateral clypeal lobes; funnel-shaped marks behind eyes running to occiput, sometimes interrupted; head posteriorly; transverse stripe anterior to dorsal carina on pronotum, connecting to stripes running along humeri to humeral carinae, then ventrally in front of carinae, stripes sometimes not connected, or humeral stripes reduced to spots; three longitudinal stripes on scutum, connected anteriorly and posteriorly, continuous with triangular mark on scutellum, which is narrow where connecting with black posterior margin of scutellum, continuous with narrow median line on metanotum, which is sometimes broadened where connecting with black posterior margin of metanotum, continuous with broad stripe along propodeal concavity; four lateral marks on propodeum, some of which may form irregular stripes; variable marks usually on propleura; three spots of varying development anteriorly on mesepisternum, occasionally forming stripes but not all connected; irregular stripe running from beneath forewing along meso-metapleural suture to midcoxa; short dorsal stripes on mid- and hindcoxae, trochanters, and most of femora dorsally; tibiae and tarsi brownish; flaring longitudinal stripe along metasomal tergum I, continued as short basal stripe on tergum II and apical spots on terga II–V; posterior margins of terga and sterna II–V; brownish stains covering varying amounts of discs of terga, sometimes reddish to orange, often verging into black at edges, sometimes distinct black spots or stripes; sterna with brownish to blackish transverse spots or stripes; tergum VI usually largely brownish; wings yellowish anteriorly, costal and basal cells mostly yellow, veins light brown.

NEST: A single nest was collected by Mateus and Noll, quite close to the bank of Rio Acre (at 9°30′S 67°31′W), in Porto Acre municipality, Acre State, northwestern Brazil. It was found in a small orchard, on a *Citrus* sp. tree, 2.3 m above the ground. The nest was built on a narrow twig (3 mm in diameter), and was of sessile initiation, with a single comb. The carton was brittle and constructed of short chips. Cells and the envelope are mostly brownish bearing some yellowish circular stripes in the envelope and around the entrance hole (fig. 9). The different colors gave good camouflage protection to the nest. This pattern is similar to *Asteloeca ujhelyii* nests (figs. 12–13), but differs in color from *Asteloeca traili* nests we have seen, which tend to be predominantly grayish (fig. 14).

Nest construction in *Asteloeca* differs from other genera that build astelocyttarus nests in that the cell bases can be seen from the back and the cell contours laterally (Wenzel, 1998). In this specimen too, the cell bases



Figs. 9–14. Nest. 9–11, *Asteloeca lutea* n. sp.; 9, from front; 10, from back; 11, envelope removed. 12–13, *Asteloeca ujhelyii* (Ducke) in field from below. 14, *Asteloeca traili* (Cameron), in field from below.

are visible on back of the comb (fig. 10) and are strongly attached to the substrate. Oral secretion had been intensively applied outside the comb and envelope, which gives a glossy appearance to the nest. Similarly, the substrate was richly covered by glossy salivary secretion near the comb, extending for a few centimeters along the twig.

The envelope is a single sheet (fig. 9), with border walls of the external cells supporting envelope construction. Small translucent windows are formed in the envelope due to the extensive use of oral secretion. These ''windows'' are an apomorphic feature, shared with *Clypearia* and *Metapolybia*. The entrance hole has a single oval-shaped collar (6 mm × 4 mm), originally centrally located. The nest had an expansion under construction (see fig. 9); there are 83 cells under the envelope (fig. 11; 52 cells with an operculum and 41 with larvae in different stages), and 107 cells in different stages (size) of construction outside the envelope. Cell walls are straight and parallel-sided with a hexagonal shape; cells with an operculum are 15 mm high on average. Eggs and small larvae were found. Forty-three adult females were collected with the nest, as well as 4 returning individuals, for a total of 47 adults.

The nest architecture is thus similar to that

described by Wenzel (1998), and this specimen confirms his prediction that the expansion in the genus is sudden and part of the envelope is removed to allow contiguous expansion.

MALE, LARVA: male unknown; larvae not preserved.

TYPE MATERIAL: holotype female from **Bolivia**: Dpto. Santa Cruz, Buena Vista, 9 January 1991 (James M. Carpenter and John W. Wenzel), in the American Museum of Natural History (AMNH). One paratype female labeled "Covendo/Boliv." and "September/ O E White Coll" and "Mulford/Bio Expl/ 1921–22," with a determination label in Bequaert's handwriting as *Polybia ujhelyii* Ducke and a determination label in Richards' handwriting as *Polybia traili* Cam. 1906 morph *ujhelyi* Ducke 1909, in the U.S. National Museum of Natural History (USNM). Nine paratype females from **Brazil**: Acre, Rio Acre, 9°30′S 67° 31′W, 56 m, 17 October 1998 (Sidnei Mateus and Fernando Noll), five in the AMNH, two in the Universidade de São Paulo, Ribeirão Preto (RP), and two in the Museu de Zoologia da Universidade de São Paulo. A further 35 females collected from the same colony as these paratypes were dissected and are preserved in RP, but are not paratypes. One paratype female from **Ecuador**: Napo, Muyuna, 5 km W of Tena, 500 m, 10 April 1981 (Martin Cooper), in the personal collection of M. Cooper (coll. Cooper).

The USNM paratype is presumably the source of the record of *ujhelyii* for Bolivia by Bequaert (1944; he did not mention number of specimens), as well as the specimen of morph *ujhelyii* mentioned by Richards (1978: 199):

> A female from Bolivia: Corendo, ix.1921–2 (*O. E. White*) (USNM) might be put here. It is black but with the ground colour largely replaced by sulphur-yellow on head, thorax and gaster. Gaster with reddish orange blotches on tergites 2–5. Wings yellowish brown.

"Corendo" is a lapsus for Covendo, which is printed on the label, and which is in the Dpto. La Paz on the Upper Beni above Santa Ana, at ca. 15°47′S 67°07′W and 800–900 m (Cooper, *in litt.*). This paratype has the metasomal tergal blotches paler than other specimens of *A. lutea*: They are light orange, lighter than in *A. ujhelyii*, but the black markings and yellow edges clearly contrast with the discs of the terga, unlike *ujhelyii* but like other *lutea*. The markings are otherwise like other specimens of *lutea*, for example, the sulfur-yellow ground color and yellowish wings.

DISTRIBUTION: Bolivia, Brazil, Ecuador and also evidently French Guiana. This species is likely the specimen mentioned as a slight variant of *P. ujhelyii* by Ducke (1909: 626):

> Un exemplaire plus petit (14 millim.), d'un testacé clair presque aune soufre, ayant la ligne moyenne noire du thorax continuée, encore sur le 1^{r} et 2^{e} segment dorsal et quelques taches et bandes foncées sur les segments antérieurs de l'abdomen, se trouve dans la collection de M. DE GAULLE à Paris (Guyane française, Bas Maroni, Les Hattes, coll. LE MOULT).

The smaller size, sulfur-yellow color, and black stripe on the first metasomal tergum correspond to *A. lutea*.

ETYMOLOGY: The name refers to the more extensive yellow color in this species than in other species of *Asteloeca*.

REMARKS: The left wings of the holotype are damaged, with more than half the length of each sheared off, and the left hind leg is lost beyond the femur. The antennae have also been broken off, and are glued to the locality label. Carpenter and Wenzel discovered the specimen on a road just outside of the town of Buena Vista, and then searched a considerable time for the nest, but were unable to find it.

The paratype from Covendo has the occiput appearing slightly compressed and drawn out in direct dorsal view, less so than in figure 3 but more angular than in other specimens of *A. lutea*, which would only show any compression if examined in an oblique lateral view. The condition in the Covendo specimen is perhaps due to damage, as there is a dent in the cuticle behind the eye, and the left side does not show the compression to the same extent. The specimen is otherwise morphologically like other *A. lutea* in the relatively shorter first metasomal segment and smaller overall size (forewing length = 11.14 mm), and the thyridium elongate and narrow, not broad as in *A. ujhelyii*.

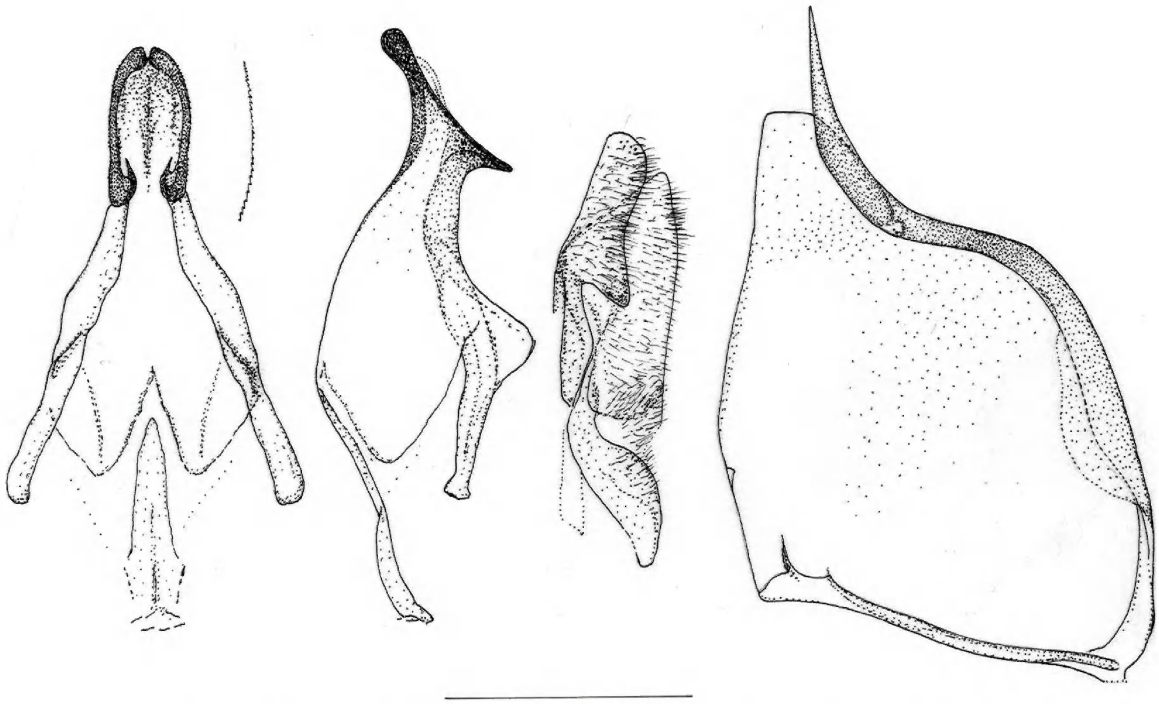


Fig. 15. *Asteloeca ujhelyii* (Ducke), male genitalia. Left to right, aedeagus in ventral view, aedeagus in lateral view, volsella in interior lateral view, paramere in interior lateral view. Scale as in figure 16.

***Asteloeca ujhelyii* (Ducke),** revised status

Polybia Ujhelyii Ducke, 1909: 626, female—[Brazil] "Teffé (Haut Amazone)" (lectotype Muséum National d'Histoire Naturelle, Paris [examined]).

Occipitalia traili morph *ujhelyi* [!]; Richards, 1978: 199.

In coloration this species is very distinct from *A. traili*: The reddish-orange color of the metasomal terga leaves their yellow lateral margins inconspicuous, unlike the strongly contrasting black and yellow metasoma of *A. traili*. The synonymy of *A. ujhelyii* with *A. traili* by Richards (1978) was perhaps due to mixing of samples from different nests, as suggested in the Background section. We and colleagues have now seen many colonies from Acre, the state in which Hamilton's nests were collected, and they are always one color form or the other, even if the nests with the different forms are very close to one another. The specimen listed by Richards (1978: 199) as "intermediate" from the colony from Amazonas had the metasoma "red-brown much darker". We have seen a specimen of *A. traili* from a colony from Acre, on the campus of the Universidade Federal do Acre, in which the metasoma is tinged with dark reddish-brown, but this in no way resembles *A. ujhelyii*: The yellow markings of the specimen are also reduced, so that it is darker compared to *A. ujhelyii* than most specimens of *A. traili*. Orlando Silveira (*in litt.*) has also seen a specimen in the collection of the Museu Goeldi (MG) from Cruzeiro do Sul, collected by W. D. Hamilton on 23 February 1968, which also has the metasoma marked with reddish, but as he stated, "it does not look as 'intermediary' between *traili* and *ujhelyii*."

MALE: The genitalia are illustrated in figure 15. Aedeagus with apex short and dark, its ventral margin very finely serrate, ventral apodemes long, dorsal apodeme incompletely sclerotized; cuspis and digitus on mesal side densely covered with short pubescence; paramere in lateral view with ventral margin rounded. Raw's (1985: figs. 18–22) illustrations of the genitalia of *Asteloeca* are evidently based on *A. ujhelyii*, as the paramere is rounded ventrally in lateral view.

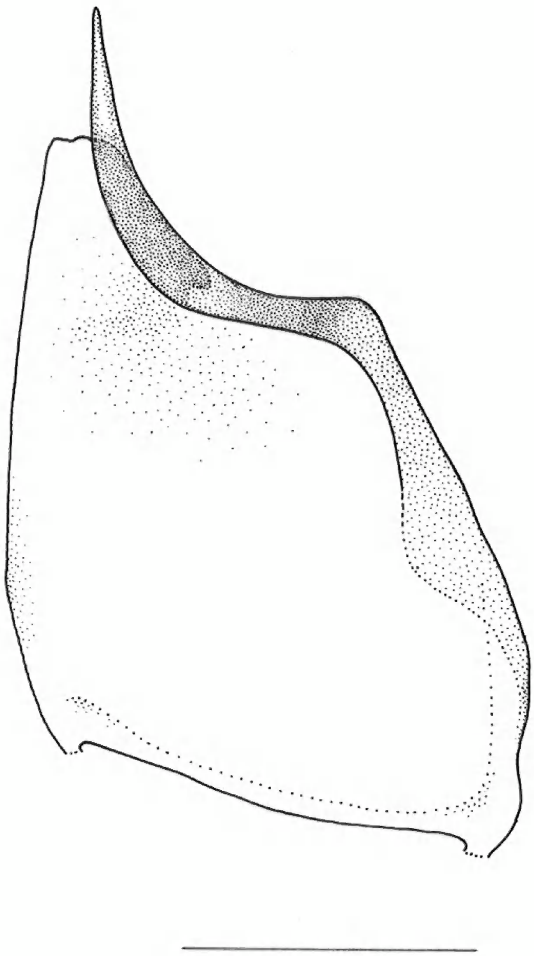
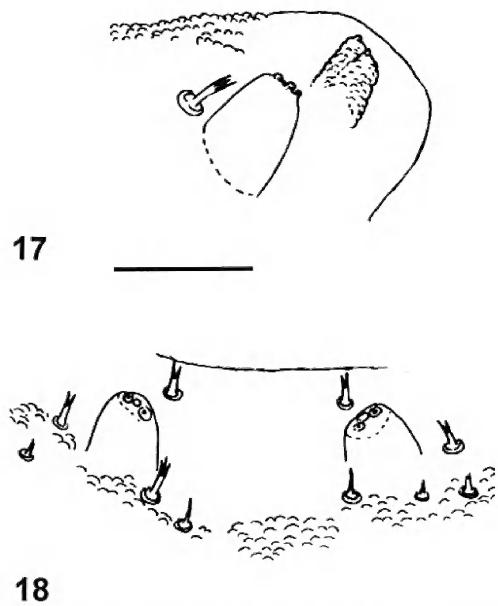


Fig. 16. *Asteloeca traili* (Cameron), paramere in interior lateral view. The scale bar is 1 mm.



Figs. 17–18. Final instar larva of *Asteloeca ujhelyii*. 17, apical part of maxilla; 18, labial palpi and area around them. The scale bar is 0.1 mm.

FINAL INSTAR LARVA: Specimens examined: four larvae from a nest collected at Acre, Xapuri, 9 September 2001 (Fábio S. do Nascimento). Additions to and differences from Kojima (1998) are as follows. Maxilla with ill-defined scalelike spicules on outer-apical surface; galea with ill-defined scale like spicules except for apex (fig. 17). Area around labial palpi with sparse, ill-defined scalelike spicules (fig. 18). Atrium of spiracle sometimes with sparse, minute spicules.

DISTRIBUTION: Brazil, Colombia, Ecuador, and Peru. Carpenter has seen the specimens recorded by Richards (1978). In an unpublished manuscript, preserved in the Natural History Museum, London, Richards recorded *A. traili* from Colombia: Putumayo, and Sarmiento (1994: 359) published this record, but according to Cooper (*in litt.*), who collected the specimen, this record refers to *A. ujhelyii*. Cooper specifies that the locality in Putumayo is Mocoa. New records are **Brazil**: Acre, Fazenda Catuaba, 20 km east of Rio Branco, 10°04′36″S 67°37′40″W, July 2001 (Fábio S. do Nascimento) [colony in RP]; Acre, Rio Branco, 9 September 2001 (Fábio S. do Nascimento) [colony in RP; 2♀ and 2♂ in AMNH]; Acre, Xapuri, 10°49″S 68°22′W, 9 September 2001 (Fábio S. do Nascimento) [colony in RP; 2♀ in AMNH]; **Colombia**: Putumayo, Villa Garzón, 400–550 m, 29 December 1987 (Martin Cooper) [♀ in coll. Cooper]; **Ecuador**: Napo, Panacocha, 12 March 1998 (Martin Cooper) [♀ in coll. Cooper]; Napo, Muyuna, 5 km W of Tena, 500 m, 18 August 1981 (Martin Cooper) [♀ in coll. Cooper]; **Peru**: Huánuco, Tingo Maria (Rio Huallaga), September 1947, 700 m (W. Weyrauch), 679-A [♀ in AMNH]; Loreto, Rio Sucusari at Rio Napo, 25 December 1990 (James M. Carpenter and John W. Wenzel), Nest 901225-8 [colony: 2♀ dissected by F. B. Noll, 2♂ and nest in AMNH].

A paralectotype of *A. ujhelyii* in the MG,

not mentioned in Carpenter (1999), is a female lacking the metasoma, labeled according to Silveira (*in litt.*) "Brazil, Estado do Amazonas" (typewritten), "Teffé" (handwritten) and the numbers 631, 120.

REMARKS: Nascimento et al. (in press) demonstrated the occurrence of cyclical oligogyny in this species, and that it is behaviorally mediated, through conflicts among queens which lead to queen elimination. Some further information on the biology of this species appears in Noll et al. (in prep.), who included this species in their study of caste evolution. Like species in related genera (*Metapolybia*, *Clypearia*, and *Synoeca*), morphological differences between queens and workers are slight, and intermediates (i.e., uninseminated individuals with some mature oocytes) are absent.

Asteloeca traili (Cameron)

Polybia traili Cameron, 1906: 383, female—[Brazil] "Rio Purus, Amazons" (holotype in Natural History Museum, London [examined]).

Polybia Ujhelyii var. *obscura* Ducke, 1909: 626, female—[Brazil] "Fontebôa (Haut Amazone)" (holotype in Hungarian Natural History Museum, Budapest [examined]).

Occipitalia traili morph *traili*; Richards, 1978: 199.

Asteloeca traili; Raw, 1985: 185 (type species of *Asteloeca* n. gen.), 187.

This species is readily recognized by the dark ground color, against which the yellow markings are very conspicuous, particularly on the metasoma. The synonymy of *P. ujhelyii* var. *obscura* with *A. traili* was confirmed by Carpenter (1999: 6).

MALE: The paramere is illustrated in figure 16. The shows the most notable difference compared to *A. ujhelyii*, which is the strongly produced ventral margin of the paramere seen in lateral view.

FINAL INSTAR LARVA: Specimens examined: five larvae from a nest collected at Acre, Rio Acre, 17 October 1998 (Sidnei Mateus et al.). As larvae of *A. ujhelyii* with a few minor differences as follows: cranium darker than in *A. ujhelyii*; clypeus nearly entirely pigmented (lower part unpigmented in *A. ujhelyii*); setae on labrum not branching apically (some bifid in *A. ujhelyii*).

DISTRIBUTION: Brazil and Peru. Richards (1978: 199) recorded this species, as "morph" *traili*, from Peru: Loreto; Carpenter has seen the specimens. In Richards' unpublished manuscript in the Natural History Museum, he also recorded *traili* from Bolivia: Beni, but it is possible this record referred to "morph" *ujhelyii*, which may in turn have been *A. lutea*. New records, all referring to colonies collected, are **Brazil**: Pará, Belém, Utinga, 01°25′S, 48°24′W, 10 m, 19 November 1997 (James M. Carpenter and Orlando T. Silveira), Nest 971119-2 [colony and nest in AMNH]; Pará, Belém, Mocambo, 4 April 1980 (W. L. Overal) [2♀ in MG]; Pará, Melgaço, Caxiuanã, ECFPn, 26 March 1998 (Silveira and Pena) [colony and nest in MG]; Estado do Pará, Bosque; October 1944 (no collector), with an identification label "Polybia ujhelyii var. obscurus W.D. Hamilton det." [♀ lacking metasoma in MG]; Acre, UFAC campus, 9°57′S, 67°52′W, 5 October 1998, 80 m (Sidnei Mateus and Fernando B. Noll) [colony in RP, 2♀ in AMNH]; Acre, AC 10 N Rio Branco, 9°50′S, 67°45′W, 12 October 1998, 120 m (James M. Carpenter), Nest 981012-6 [colony in AMNH]; Acre, Rio Acre, 9°32′S 67°30′W, 17 October 1998, 10 m (Sidnei Mateus et al.) [nest in RP; larvae in AMNH]; Acre, Xapuri, 10°49″S 68°22′W, 12 September 2000 (Fábio S. do Nascimento) [colony in RP; 2♀ and 2♂ in AMNH].

REMARKS: Although *A. traili* and *A. ujheylii* are distinct species, they are similar in size and structure relative to *A. lutea*. Among the similarities, the posterolateral expansion of the occiput appears to be a synapomorphy, as it is not found in *Metapolybia*, the sister-group of *Asteloeca*. Although *A. ujhelyii* and *A. lutea* are superficially similar in coloration, the occipital character supports *A. traili* and *A. ujhelyii* as sister-species.

ACKNOWLEDGMENTS

We thank Martin Cooper for the loan of specimens and providing valuable information, Orlando Silveira for providing data on specimens in the MG, John Wenzel and R. Zucchi for suggestions on the manuscript, Elder Morato for assistance in Rio Branco, and Dave Furth for assistance at the USNM. Field trips to Acre by do Nascimento, Ma-

teus, and Noll were supported by Fapesp and CNPq. The figure of the male genitalia of *A. ujhelyii* was given by the late J. van der Vecht to Carpenter as part of a parcel of unpublished figures of polistine genitalia. The figure of the paramere of *A. traili* was provided by Valerie Giles.

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